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EXAMINER	
TURNER, KATHERINE ANN	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/807,333	OKUYAMA ET AL.	
	Examiner	Art Unit	
	Katherine Turner	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6-13 and 15-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6-13 and 15-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 4, 2008 has been entered.

Response to Amendment

2. The amendment filed December 4, 2008 has been entered. Claims 1, 3-4, 6-13, 15-26 and 18-21 are pending. Claims 1, 13, 15 and 21 are amended. Claims 2, 5, 14 and 17 are cancelled.

3. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on February 12, 2008.

Claim Objections

4. The objection to claim 13 is withdrawn, because the claim has been amended.

5. Claims 1 and 9 are objected to because of the following informalities: claims 1 and 9 contain typographical errors. Claim 1 contains a repetition of a phrase "a

negative electrode sheet containing a negative electrode containing a negative electrode active material" and claim 9 contains a miscellaneous "25" which was added after the original claim listing, yet not included in amendment. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The claim rejection under 35 U.S.C. 112, second paragraph, on claim 21 is withdrawn, because the claim has been amended.

Claim Rejections - 35 USC § 103

7. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921) in view of Okazaki et al. (JP 401059782A), Porter et al. (US 3,840,404), Espig et al. (GB 1256419), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), and Norio et al. (JP10-083836; refer to IPDL JPO machine translation), and as evidenced by Takeuchi et al. (US 2003/0047809), Golovin et al. (US 5,733,677), Hatakeyama et al. (US 6,063,503), and Hoyt et al. (US 5,445,884) on claims 1-3, 6, 10-12, 13-15, and 20-21 are withdrawn, because claims 1, 13, 15 and 21 has been amended and claims 2 and 14 have been cancelled.

8. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921) in view of Okazaki et al. (JP 401059782A), Porter et al. (US

3,840,404), Espig et al. (GB 1256419), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), Norio et al. (JP10-083836; refer to IPDL JPO machine translation), and Arao et al. (WO 2063703 A1), as evidenced by Takeuchi et al. (US 2003/0047809), Golovin et al. (US 5,733,677), Hatakeyama et al. (US 6,063,503), Hoyt et al. (US 5,445,884) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag) on claims 4 and 19 are withdrawn, because independent claims 1 and 15 have been amended.

9. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921) in view of Okazaki et al. (JP 401059782A), Porter et al. (US 3,840,404), Espig et al. (GB 1256419), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), Norio et al. (JP10-083836; refer to IPDL JPO machine translation), Arao et al. (WO 2063703 A1), and Kelsey et al. (US 2002/0132161 A1), as evidenced by Takeuchi et al. (US 2003/0047809), Golovin et al. (US 5,733,677), Hatakeyama et al. (US 6,063,503), Hoyt et al. (US 5,445,884) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag) on claim 7 is withdrawn, because independent claim 1 has been amended.

10. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921) in view of Okazaki et al. (JP 401059782A), Porter et al. (US

3,840,404), Espig et al. (GB 1256419), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), Norio et al. (JP10-083836; refer to IPDL JPO machine translation), Arao et al. (WO 2063703 A1), Kelsey et al. (US 2002/0132161 A1) and Yoshino et al. (JP02060052A), as evidenced by Takeuchi et al. (US 2003/0047809), Golovin et al. (US 5,733,677), Hatakeyama et al. (US 6,063,503), Hoyt et al. (US 5,445,884) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag) on claims 8-9 are withdrawn, because independent claim 1 has been amended.

11. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921) in view of Okazaki et al. (JP 401059782A), Porter et al. (US 3,840,404), Espig et al. (GB 1256419), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), Norio et al. (JP10-083836; refer to IPDL JPO machine translation), Arao et al. (WO 2063703 A1), Kelsey et al. (US 2002/0132161 A1), Yoshino et al. (JP02060052A) and Tinker (US 5,506,067), as evidenced by Takeuchi et al. (US 2003/0047809), Golovin et al. (US 5,733,677), Hatakeyama et al. (US 6,063,503), Hoyt et al. (US 5,445,884) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag) on claims 16-18 are withdrawn, because independent claim 15 has been amended, and claim 17 has been cancelled.

12. Claims 1, 3-4, 6, 8-13, 15 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921), Arao et al. (WO 2063703 A1; please refer to English equivalent US 7,205,042 B2 for citation), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996), Norio et al. (JP10-083836; please refer to IPDL JPO machine translation), Okazaki et al. (JP 401059782A), Porter et al. (US 3,840,404), and Yoshino et al. (JP02060052A), as evidenced by Hatakeyama et al. (US 6,063,503) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag).

Regarding claims 1, 4, 8-9, 13, 15, 19 and 21, Kaplan et al. discloses an air battery (10) comprising:

- a cathode can (50 and 320) (Applicant's container) having a surface in which openings (100) (Applicant's air pores) are formed (figures 1 and 6; column 2, lines 61-63; column 3, lines 3-4; column 4, lines 41-46; column 6, lines 55-61);
- an electrode group provided in the battery container and including a cathode (80 and 400) (Applicant's air positive electrode) (figures 1 and 6; column 1, line 29; column 2, line 65; column 7, line 5),
- an anode (40 and 420) (Applicant's negative electrode) (figures 1 and 6; column 1, line 28; column 3, line 13; column 7, lines 6-7),
- and a separator (90 and 410) provided between the cathode and the anode (figures 1 and 6; column 2, line 65; column 6, lines 19-32; column 7, line 6);

- a membrane (70 and 390) (Applicant's barrier film) which is provided between the surface of the cathode can (50 and 320) (Applicant's battery container) and the cathode (80 and 400) (Applicant's positive electrode) of the electrode group, the membrane (70 and 390) (Applicant's barrier film) being formed of polytetrafluoroethylene, a fluorine resin, and having a thickness of 100 μm (figures 1 and 6; column 5, lines 11-17),
- and an air diffusion layer (60 and 380) (Applicant's gap holding member)
- the membrane (70 and 390) (Applicant's barrier film) can be laminated onto the cathode can (50 and 320) (Applicant's container) (column 5, lines 14-15), and the cathode can (50 and 320) has the air diffusion layer (60 and 380) sealed onto it (column 4, lines 63-67), therefore the membrane (70 and 390) can be laminated onto the air diffusion layer (60 and 380) and together they comprise a laminate sheet (figures 1 and 6)
- and the membrane (70 and 390) (Applicant's barrier film) is opposite to the cathode (80 and 400) (Applicant's positive electrode) (figures 1 and 6; column 4, lines 62-65; column 5, lines 4-16),
- and the air diffusion layer (60 and 380) (Applicant's gap holding member) comprising a porous film (figures 1 and 6; column 5, lines 4-11),
- wherein the openings (100 and 370) (Applicant's air pores) of the cathode can (50 and 320) (Applicant's battery container) are sealed by the air diffusion layer (60 and 380) (Applicant's gap holding member) and membrane (70 and

390) (Applicant's barrier film) laminated together (figures 1 and 6; column 4, lines 62-65; column 5 lines 13-15).

Kaplan et al. is silent as to the battery container being made of a laminate film, the negative electrode sheet containing a negative electrode active material which intercalates and deintercalates lithium ions and a non-aqueous electrolyte, a barrier film being formed of a non-porous thermoplastic resin, the oxygen permeation coefficient of the membrane (Applicant's barrier film) being 1 x 10^{-14} mol•m/m^2•sec•Pa or less, the internal pressure in the battery container during continuous discharge is lower than an atmospheric pressure by 0.1 to 80kPa, and the air diffusion layer (60 and 380) (Applicant's gap holding member) having an air permeability of 1000 sec/100 cm^3 or less and being formed of hydrophobic material containing at least one polymer selected from the group consisting of polyolefin, fluoroplastic, polyphenylene sulfide, polyethylene terephthalate, polybutylene terephthalate, and polyether ether ketone.

Kaplan et al. discloses a cathode and anode can (50 and 20) as the battery container made of steel (column 3, lines 2-3; column 4, lines 41-45), but is silent as to the can being made of a laminate film.

Arao et al. teaches a laminate film containing aluminum, and that the aluminum foil can be as thick as 100 μm (column 3, line 30), and the polypropylene resin can be as thick as 100 μm (column 7, lines 43-45; column 7, lines 50-54; column 8, lines 32-35). Arao et al. teaches that the laminate for battery encasement provides miniaturization and lightening in weight compared with metal cans (abstract; column 1, lines 31-50).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Arao et al.'s aluminum resin material for Kaplan et al.'s steel nickel material (column 4, lines 41-43), because Arao et al. teaches that the laminate for battery encasement provides miniaturization and lightening in weight compared with metal cans (abstract; column 1, lines 31-50).

Rosato et al. evidences that aluminum has a Young's modulus of 76 x 10^3 MPa (page 1325, Table 17-1), with Arai et al.'s maximum thickness of 100 x 10^{-6} m, which would lead to Y x T = 7.6. Rosato et al. evidences that polypropylene has a Young's modulus of 50 x 10^3 MPa (page 1325, Table 17-1), with Arai et al.'s maximum thickness thickness of 100 x 10^{-6} m, which would lead to Y x T = 5.

Kaplan et al. discloses an anode (40 and 420) (Applicant's negative electrode) (figures 1 and 6; column 1, line 28; column 3, lines 12-13; column 7, lines 6-7) of zinc, a cathode (80 and 400) (Applicant's positive electrode) of manganese dioxide (MnO_2), and an aqueous electrolyte (column 3, lines 45-46), but is silent to it containing a negative electrode sheet containing negative electrode active material.

Abraham et al. teaches an air lithium secondary battery with a lithium foil, a carbon composite cathode, and a non-aqueous electrolyte (column 2, lines 35-39). Abraham et al. teaches that lithium oxygen cells have very high energy density and higher calculated open-circuit voltage than zinc oxygen cells (Table I; column 3, lines 29-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kaplan et al.'s zinc oxygen cell electrodes and

electrolyte combination with Abraham et al.'s lithium oxygen cell electrodes and electrolyte combination, because Abraham et al. teaches lithium oxygen cells have very high energy density and higher calculated open-circuit voltage than zinc oxygen cells (Table I; column 3, lines 29-32).

Kaplan et al. and Abraham et al. teach a sheet lithium metal anode, but are silent to the negative electrode active material intercalating and deintercalating lithium ions.

Norio et al. teaches an air lithium battery that contains a sheet of negative electrode (2) active material which carries out occlusion discharge of the lithium ion (Applicant's intercalates and deintercalates lithium ions (paragraph 8), and an anode (1) (Applicant's positive electrode) (paragraph 15) that contains carbonaceous material (paragraph 9), and a nonaqueous solid electrolyte (3) (drawing 1; paragraphs 11-14), because the carbonaceous negative electrodes that intercalate and deintercalate lithium ions in a lithium air cell provide improved cell capacity and charge-and-discharge cycle life, over lithium metal anodes (paragraphs 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the carbonaceous sheet anode of Norio et al. for Kaplan et al. and Abraham et al.'s lithium negative electrode, because Norio et al. teaches that the carbonaceous negative electrodes that intercalate and deintercalate lithium ions in a lithium air cell provide improved cell capacity and charge-and-discharge cycle life, over lithium metal anodes (paragraphs 4-7).

Kaplan et al. discloses an air permeable membrane (70 and 390) (Applicant's barrier film), but is silent to a barrier film being formed of a non-porous thermoplastic resin.

Okazaki et al. teaches an air battery utilizing a non-porous thin film (11) (Applicant's barrier film) polymethylpentene (Abstract), which is 0.3 μm (Table 1), because it has selective permeability of oxygen (Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kaplan et al.'s membrane for Okazaki et al.'s nonporous polymethylpentene film, because Okazaki et al. teaches that nonporous polymethylpentene film has selective permeability of oxygen for an air battery (abstract).

Hatakeyama et al. evidences that polymethylpentene is a thermoplastic polyolefinic resin (column 7, lines 20-29).

Kaplan et al. and Okazaki et al. teaches a nonporous polymethylpentene film as Kaplan et al.'s membrane (70) (Applicant's barrier film), and Applicant discloses that polymethylpentene film at 10 μm has the oxygen permeation coefficient of 4.9×10^{-15} mol•m/m^2•sec•Pa (page 39, table 1), but Kaplan et al. and Okazaki et al. are silent as to the polymethylpentene film being 10 μm.

Porter et al. teaches an inner layer (14b) which allows oxygen or air to permeate therethrough, but will prevent moisture or electrolyte from passing therethrough (Applicant's barrier film) (figure 1; column 2, lines 35-38). Porter et al. teaches that the current of the cell may be limited by limiting the diffusivity (Applicant's oxygen

permeation) of the layer (14b) by varying the thickness of the layer (column 2, lines 39-42).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the thickness of the polymethylpentene film (Applicant's barrier film) to be 10 μm, because Porter et al. teaches that the current of the cell may be limited by limiting the diffusivity (Applicant's oxygen permeation) of the layer (14b) by varying the thickness of the layer (column 2, lines 39-42). *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Kaplan et al. discloses the air diffusion layer (60 and 380) (Applicant's gap holding member and porous film), but is silent as to it having an air permeability of 1000 sec/100 cm^3 or less and being formed of hydrophobic material containing at least one polymer selected from the group consisting of polyolefin, fluoroplastic, polyphenylene sulfide, polyethylene terephthalate, polybutylene terephthalate, and polyether ether ketone.

Yoshino et al. teaches polypropylene and polyethylene as the porous film (Applicant's gap holding member) for selectively permeating oxygen and support to the other film layer (Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Kaplan et al.'s porous film for Yoshino et al.'s polypropylene and polyethylene film, because Yoshino et al. teaches that they provide the ability to selectively permeate oxygen, and provide support to the other film layer (abstract).

Applicant discloses that polypropylene film has the air permeability of 4.5 sec/100 cm^3 (page 39, table 1), and that polyethylene film has the air permeability of 450 sec/100 cm^3 (page 39, table 1).

Kaplan et al. does not specifically disclose the internal pressure in the air battery container during continuous discharge. However, it is the position of the examiner that such properties are inherent, given that both Kaplan et al.; modified by Arao et al., Abraham et al., Norio et al., Okazaki et al., Porter et al. and Yoshino et al.; and the present application utilize the same barrier film of polymethylpentene (10 μm), the same gap holding member of polypropylene or polyethylene porous films with air permeability of 1000 sec/100 cm^3 or less and same thickness of 100 to 200 μm (Kaplan et al. column 5, lines 8-10), the same laminate film satisfying the formula $(Y \times T) < 10^2$, and same negative electrode carbonaceous material which intercalates and deintercalates lithium ions. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

Regarding claim 3, Kaplan et al. discloses an air battery wherein the ratio of the gap in the battery container except the portion of the laminated sheet is 5.6 to 10%, which falls into the range of 5 to 40% (figures 1 and 6; column 3, lines 3-4; column 4, lines 41-49; column 5, lines 7-15).

The ratio of the gap in the air battery container, the area between the cathode and anode cans (20, 50, 310, and 320), of Kaplan et al. is within the range of 5 to 40% (figures 1 and 6). The cathode can (50 and 320) has a height of 4 mm and a thickness

of 0.25 to 0.5 mm (column 4, lines 41-49), the anode can (20 and 310) has a thickness of 0.2 to 0.5 mm (column 3, lines 3-4), the air diffusion layer (60 and 380) has a thickness of 0.1 to 0.2 mm (column 5, lines 7-11), and the membrane (70 and 390) has a thickness of 0.1mm (column 5, lines 12-15). Working with these numbers, the space inside the battery container is the thicknesses of the containers top and bottom faces (0.25 to 0.5mm and 0.2 to 0.5 mm) subtracted from the height of the container (4 mm), which equals 3 to 3.55 mm. The thickness of the gap is the thickness of the air diffusion layer (0.1 to 0.2 mm) added to thickness of the membrane (0.1 mm), which equals 0.2 to 0.3 mm. The ratio of the gap (0.2 to 0.3 mm) in the battery container (3 to 3.55 mm) is 5.6 to 10%, which falls within the range of 5 to 40%.

Regarding claim 6, Kaplan et al. discloses an air diffusion layer (60 and 380) (Applicant's gap holding member) of 100 to 200 µm (figures 1 and 6; column 5, lines 7-8).

Regarding claims 10, 11, and 20, Kaplan et al. discloses an air diffusion layer (60 and 380) (Applicant's gap holding member) which is sealed to the cathode can (column 4, lines 63-67), with a membrane (70 and 390) (Applicant's barrier film) which is then laminated onto the cathode can (50 and 320) (column 5, lines 14-15) upon the already sealed air diffusion layer (60 and 380) (figures 1 and 6; column 4, lines 63-67), but is silent as to the laminated air diffusion layer and membrane further comprising a second gap holding member (Applicant's claim 10 and 20), comprising at least one selected from the group of a porous film, a nonwoven fabric, and a woven fabric (Applicant's claim 11).

Okazaki et al. teaches a second porous body (4) (Applicant's second gap holding member) which is layered in between the nonporous polymethylpentene film (Applicant's barrier film) and the battery container with air intake holes (3) (Applicant's air pores) (figures 1-2; Abstract). The polymethylpentene film is layered between the second porous body (4) and the porous film (2) which is the nearest layer to the cathode (figures 1-2; Abstract). Okazaki et al. further teaches that the second porous body (Applicant's second gap holding member) is made of a porous film (Abstract). Okazaki et al. teaches that this polymethylpentene film and the two porous films, one for support and one for air diffusion, increases both the high rate performance and the low rate performance of a battery (Abstract)

It would have been obvious to one of ordinary skill in the art at the time of the invention to add a second gap holding member to the laminated layers of Kaplan et al. because Okazaki et al. teaches that this polymethylpentene film and the two porous films, one for support and one for air diffusion, increases both the high rate performance and the low rate performance of a battery (Abstract).

Regarding claim 12, Kaplan et al. discloses a cathode (80 and 400) (Applicant's air positive electrode) containing carbon (figures 1, 2 and 6; column 5, lines 31-32).

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921), Arao et al. (WO 2063703 A1), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), Norio et al. (JP10083836), Okazaki et al. (JP 401059782A), Porter et al. (US 3,840,404), and

Yoshino et al. (JP02060052A), as evidenced by Hatakeyama et al. (US 6,063,503) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag), as applied to claims 1, 3-4, 6, 8-13, 15 and 19-21 above, and further in view of Kelsey et al. (US 2002/0132161 A1).

Kaplan et al. discloses an air diffusion layer (60 and 380) (Applicant's gap holding member) (Applicant's gap holding member), but is silent as to the range of porosity of the porous film.

Kelsey et al. teaches that barrier layers (Applicant's gap holding member) are modified or altered to affect, e.g., increase or decrease, the mass transport resistance of the battery cells (paragraph 56, lines 1-3). Kelsey et al. further teaches that the degree of modification can vary and can be controlled, for example, by controlling the amount of work applied. In embodiments, relative to an area that is not altered, the altered areas can have a lower porosity, e.g., 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, or 10% of the porosity of the unaltered area. The unaltered and altered areas can have similar differences in terms of mass transport resistance and/or density (paragraphs 56, 59, and 61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the porosity of the film for the benefit of adjusting the mass transport properties of the film, because Kelsey et al. teaches that barrier layers (Applicant's gap holding member) are modified, including altering the porosity, to increase or decrease the mass transport resistance of the battery cells (paragraphs 56,

59, and 61). *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

14. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplan et al. (US 6,270,921), Arao et al. (WO 2063703 A1), Abraham et al. (J. Electrochem. Soc., Vol. 143, No. 1, January 1996; cited in Information Disclosure Statement), Norio et al. (JP10083836), Okazaki et al. (JP 401059782A), Porter et al. (US 3,840,404), Yoshino et al. (JP02060052A), and Kelsey et al. (US 2002/0132161 A1), as evidenced by Hatakeyama et al. (US 6,063,503) and Rosato et al. (Injection molding Handbook; 3rd Edition; Rosato, Dominick V.; Rosato, Donald V.; Rosato, M.G.; 2000; Springer - Verlag), as applied to claims 1, 3-4, 6-13, 15 and 19-21 above, and further in view of Tinker (US 5,506,067).

Regarding claim 16, the Kaplan et al. is silent as to the electrode group contained in a bag formed of the laminated sheet.

Tinker teaches containing the cathode and anode (20 and 14) (Applicant's electrode group) in a bag formed of the gas-permeable, liquid-impermeable membrane (106) (Applicant's laminated sheet), because it is formed of gas-permeable, liquid impermeable membrane (figure 3; column 9, lines 3-7), thus it provides a liquid-impermeable layer to retain electrolyte within the cell case.

It would have been obvious to one of ordinary skill in the battery art at the time of the invention to contain the electrode group of Kaplan et al. in a bag formed of the laminated sheet, because Tinker teaches that the bag is formed of gas-permeable,

liquid impermeable membrane (figure 3; column 9, lines 3-7), thus it provides a liquid-impermeable layer to retain electrolyte within the cell case.

Regarding claim 18, Kaplan et al. discloses an air battery wherein the ratio of the gap in the battery container except the portion of the laminated sheet is 5.6 to 10%, which falls into the range of 5 to 40% (figures 1 and 6; column 3, lines 3-4; column 4, lines 41-49; column 5, lines 7-15). Please refer to paragraph 6 above for discussion.

Response to Arguments

15. Applicant's arguments filed December 4, 2008 have been fully considered but they are not persuasive.

16. *Applicant's principal arguments are:*

(a) Kaplan et al. does not disclose a barrier film of thermoplastic resin, because PTFE is not thermoplastic..

(b) Kaplan et al. does not employ a battery container formed of laminate film, which causes the range of the ratio of the gap of 5 to 40% to be impossible to attain.

In response to Applicant's arguments, please consider the following comments.

(a) Kaplan et al. alone does not disclose a barrier film of thermoplastic resin, but Kaplan et al. modified by Okazaki et al. teaches a barrier film of polymethylpentene, a thermoplastic resin. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually

where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

(b) Kaplan et al. alone does not disclose a battery container formed of laminate film, but Kaplan et al. modified by Arao et al. teaches a battery container formed of laminate film. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Correspondence/Contact Information

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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